

Subject : Astrochemistry

Title : Astrochemistry in Star and Planet Forming Regions:
Origin of Materials in Planetary Systems

Lecturer : Hideko Nomura (Division of Science)

Outline :

Thanks to the recent development of infrared and (sub)millimeter observations, it has become possible to reveal the distribution of materials in star and planet forming regions. They are expected to eventually evolve into the materials in planetary systems, such as our Solar system and the exoplanetary systems.

The subject of this lecture is the astrochemistry to understand the evolution of materials, including water and organic molecules, from star and planet forming regions to planetary systems.

Learning objectives :

- Basic of astrochemistry
- Formation of water and organic molecules in planet forming regions
- Isotope chemistry in planet forming regions

Textbook and references :

- "The physics and chemistry of the interstellar medium"
A.G.G.M. Tielens, Cambridge University Press, 2005
- Herbst & van Dishoeck 2009, Complex Organic Interstellar Molecules, ARA&A, 47, 427
- van Dishoeck et al. 2014, Water: From Clouds to Planets, PPVI, p.835
- Ceccarelli et al. 2014, Deuterium Fractionation: the Ariadne's Thread from the Pre-collapse Phase to Meteorites and Comets Today, PPVI, p.859
- Oberg & Bergin 2021, Astrochemistry and Composition of Planetary Systems, Physical Reports, 893, 1